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Hyperfine splittings of heavy quarkonium hybrids

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In the framework of the Born-Oppenheimer Effective Field Theory, the hyperfine structure of heavy quarkonium hybrids at leading order in the $1/m_Q$ expansion is determined by two potentials. We estimate those potentials by interpolating between the known short distance behavior and the long distance behavior calculated in the QCD Effective String Theory. The long distance behavior depends, at leading order, on two parameters which can be obtained from the long distance behavior of the heavy quarkonium potentials (up to sign ambiguities). The short distance behavior depends, at leading order, on two extra paramentes, which are obtained from a lattice calculation of the lower lying charmonium hybrid multiplets. This allows us to predict the hyperfine splitting both of bottomonium hybrids and of higher multiplets of charmonium hybrids. We carry out a careful error analysis and compare with other approaches.

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